Cellular Backhaul Solution Overview

Satellite Connectivity: Changing the Landscape of the Cellular Backhaul Market

With their core markets saturated, cellular operators around the world are looking to extend their services to the next one billion people in markets that currently have limited or no access to cellular services. New innovations in cellular infrastructure such as lower cost Base Stations (BTS) and unified IP networks enable operators for the first time to pursue rural markets more cost effectively. But to do so, coverage must expand to those rural markets including the smallest towns and villages where there is no terrestrial infrastructure in place. In these areas optical fiber and leased lines are not easily deployable. And microwave links are too costly to install and maintain, especially over long distances and in difficult terrain, as they have limited reach and require line of sight to operate.

Satellite is an ideal solution to extend to remote regions: it's both distance insensitive and immune to harsh conditions and terrestrial obstacles.

SCPC satellite networks have long been the de facto standard in satellite backhaul technology. But conventional dedicated SCPC links designed for very large traffic requirements to highly populated areas can't offer the flexibility to dynamically adjust to different network sizes and changing calling patterns. They are sized to the busy-hour requirements and often over-dimensioned to meet future network growth.

Cellular providers need a more cost-effective and dynamic backhaul solution.

Bringing the benefits of cellular to areas not previously served has tremendous pay offs for operators who can capitalize on this growing demand with smart, cost-effective solutions.

iDIRECT

The iDirect Opportunity

Efficient Bandwidth Allocation

iDirect's unique IP-based D-TDMA solution enables carriers to intelligently share network capacity across multiple locations, allocating bandwidth in real time and on demand to increase efficiency. Sites as small as one or two Erlangs of traffic all the way up to large scale networks can be cost effectively serviced over such a dynamic capacity allocation. The result is significant bandwidth savings.

When coupled with advanced Quality of Service (QoS) features, service providers can segregate bandwidth by groups of BTS stations and different priorities within applications or service plans. Cellular operators with diverse profiles can be grouped within the same bandwidth pool, providing substantial savings while maintaining multiple Service Level Agreements (SLAs).

Advanced QoS Management Enables Higher Reliability

iDirect's award-winning advanced QoS management features, called Group QoS, allow for countless possibilities of quality of service levels, bandwidth management and traffic prioritization to avoid congestion and service degradation.

Group QoS can prioritize bandwidth allocation according to each Base Stations' (BTS) dynamic requirements of various applications, all while protecting minimum CIR and QoS settings for high-priority traffic during busy hours. This enables service providers to develop flexible service packages with accurate SLAs more cost effectively, without compromising guaranteed quality and reliability.

Terrestrial-Grade Link Quality

iDirect's solution is ideally suited for real-time applications through its advanced feature set including UDP header compression, time-slot feathering and free-slot allocation, making the iDirect system less prone to jitter and more responsive to bandwidth requests. iDirect's time-slot feathering significantly reduces jitter between voice packets by evenly spacing timeslots across a TDMA frame. iDirect's SAR feature, a QoS based segmentation and reassembly algorithm, enables the system to interrupt large data frames to prioritize voice traffic, eliminating unused time slots and enabling more efficient multiplexing of channels.

Ease of Network Management

With iDirect's iVantage™ Network Management system (NMS) service providers can easily monitor, configure and control traffic across the entire network, making bandwidth and quality of service adjustments on the fly without costly site visits.

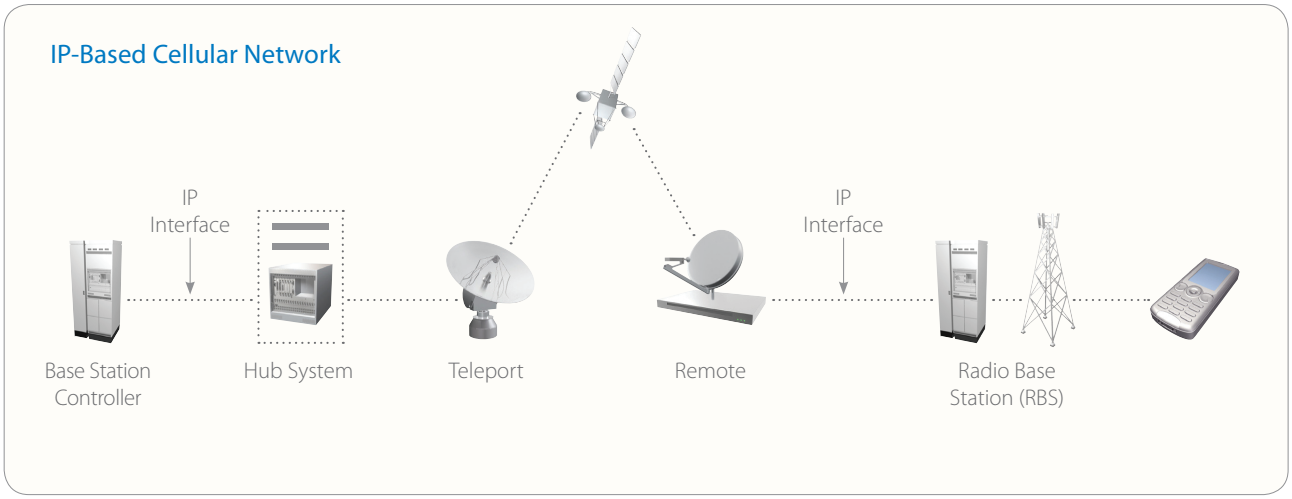
Flexible, Scalable Platform

The flexible design of the iDirect platform enables a service provider to cost effectively manage a multitude of small, medium or large networks spanning over five satellites in C- or Ku-band, all from one hub. The modular hub design allows the service provider to launch a network with a few line cards and limited bandwidth, and then scale effectively by adding new line cards as the BTS build-out continues or traffic demand grows. iDirect's line of small to large size hubs enables the service provider to deploy the most cost-effective solution for specific needs whether it's in star or mesh configuration. For very large scale networks, service providers can easily take advantage of the most efficient bandwidth technology, iDirect's DVB-S2 with Adaptive Coding and Modulation (ACM), or they can seamlessly switch high-capacity links to SCPC topology when traffic volumes justify dedicated bandwidth to very busy Base Stations.

Interoperability with All Systems

iDirect's solution is vendor agnostic and works well with all cellular backhauling systems including, GSM, UMTS and CDMA 2000, whether using mediation devices, A.bis over IP or all-IP based solutions.

While mediation devices enable the A.bis to IP conversion and increase the efficiency of iDirect's D-TDMA platform through compression of voice traffic and silence suppression, newer trends point to A.bis over IP and all-IP solutions. iDirect interoperates with all major vendors and conducts extensive tests to ensure full compatibility. These new solutions include a new bandwidth paradigm, the packetizing of the A.bis interface into an IP-Ethernet frame, making it ideal for different size base stations such as pico cells, micro and macro base stations. When combined with iDirect's efficient TDMA solution this can lead to dramatic bandwidth savings of up to 80% compared to SCPC solutions.



The network typically consists of a hub at the main switching site, the Base Station Controller (BSC). The hub transmits one large outbound carrier over satellite that is being shared by the remotes connected to the Radio Base Stations. The remote site typically consists of a small antenna, RF equipment and an iNFINITI 5000 Series Router or Evolution Series Router.

Extending Your Reach

iDirect's IP-based D-TDMA platform represents the next step in the evolution of cellular backhaul. New innovations in cellular infrastructure and satellite backhaul technology now enable operators to more profitably pursue customers in remote rural markets. Unified IP networks increase the network efficiencies while improving performance and iDirect's advanced IP-based D-TDMA solution allows for intelligent bandwidth sharing, maximizing efficiencies and reducing costs.

End-users in even the most remote regions of the world get new, more widespread and reliable cellular service. And cellular service providers are in the best position to see greater revenue opportunities when extending their reach into previously unserviceable or underserved areas.

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